

NASA SBIR/STTR Technologies

FABRY-PEROT BASED RANGING INTERFEROMETER RECEIVER FOR HSRL

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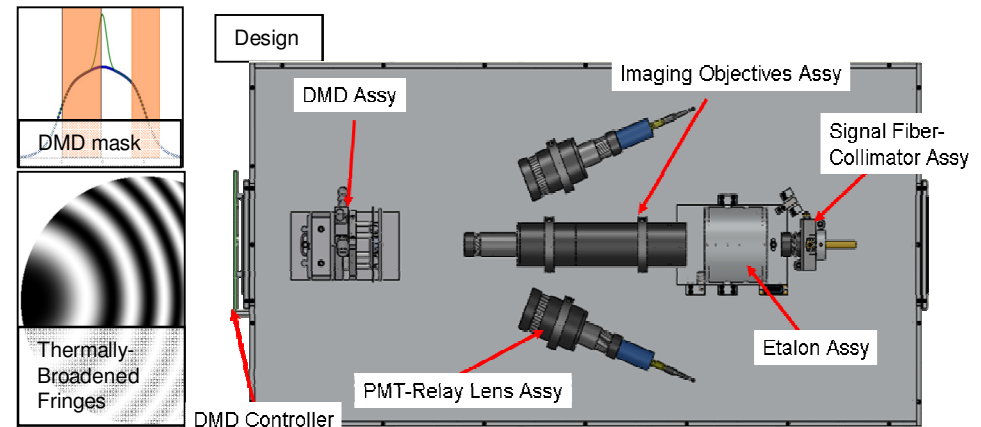
Contract number: NNX09CB25C

Identification and Significance of Innovation:

A bench-top HSRL 532nm receiver for the High Spectral Resolution Lidar System will:

- Allow cross-validation and enhancement for the highly-modular HSRL system
- Spectrally separate the aerosol and molecular backscatter
- Produce L2 Data products:
 - aerosol-to-total-scattering ratio
 - aerosol extinction coefficient
 - molecular temperature and line-of-sight (LOS) velocity
- Demonstrate the Programmable Edge Technique (PET) for enhanced measurements:
 - Digital Micro-mirror Device (DMD) provide backscatter, winds and temperature
 - Fabry-Perot interferometer to exploit spectral phenomenology
 - PMTs for simple measurement and ranging
- Develop a framework for future aircraft-mounted and 355nm implementations

TRL at the end of Contract (1-9): **5**



Technical Objectives:

- **Design laboratory bench-top HSRL receiver**
 - Aerosol scattering ratio
 - Aerosol extinction coefficient
 - Molecular Temperature
 - LOS wind velocity
- **Test assembled unit at MAC and LaRC**
 - Test 355nm interferometer at MAC with Mobile LIDAR

Work Plan:

Task 1: Specify full instrument requirements and conduct a Risk Assessment of the proposed concept

Task 2: Design the Bench-top HSRL Receiver

Task 3: Fabricate and Assemble HSRL Receiver

Task 4: Test and Verify the HSRL Receiver

NASA Applications

- Directly applicable to the highly-modular HSRL system at LaRC
- Subsequent work will extend current HSRL system

Military Applications

- Atmospheric mitigation for increasing sniper accuracy
- Portable meteorology system for long-range gunnery
- Precision landing zones for aircraft and paratroopers
- Nuclear/Biological/Chemical (NBC) threat analysis/tracking

Non-Military Applications

- Clear-air turbulence sensing for commercial aircraft
- Monitoring of tropospheric and upper-atmospheric winds

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NON-PROPRIETARY DATA